Pioneer Americas LLC
St. Gabriel Plant

- Commissioned in 1970 in St. Gabriel Louisiana.
- 52 30m² UHDE Mercury Cells
- OSHA VPP Star site since 1985
- ISO 9002 registered since 1996

Pioneer Americas LLC
St. Gabriel Plant

- EPA Regional Administrator’s Environmental Excellence Award in 1998
- Louisiana Governor's Environmental Leadership Award in 2000
- Louisiana Governor's Environmental Leadership Award in 2001

Pioneer Americas LLC
St. Gabriel Plant

- EPA Regional Administrator's Environmental Excellence Award in 1998
  - U. S. EPA Region 6 award for Air Compliance.

Pioneer Americas LLC
St. Gabriel Plant

- Louisiana Governor's Environmental Leadership Award in 2000
  - Outstanding Pollution Prevention Achievement for the REMERC mercury recovery system. The mercury content of the resulting wastes that must be disposed of has been reduced 99% resulting in a 39% reduction in TRI data for off-site transfers of mercury.

Pioneer Americas LLC
St. Gabriel Plant

- Louisiana Governor's Environmental Leadership Award in 2001

  Pollution Prevention Achievement
  for the modification of the Chlor Alkali manufacturing process, which incorporates new state-of-the-art technology, saving 85.5 million kilowatts annually and further reducing mercury emissions 300 pounds per year.

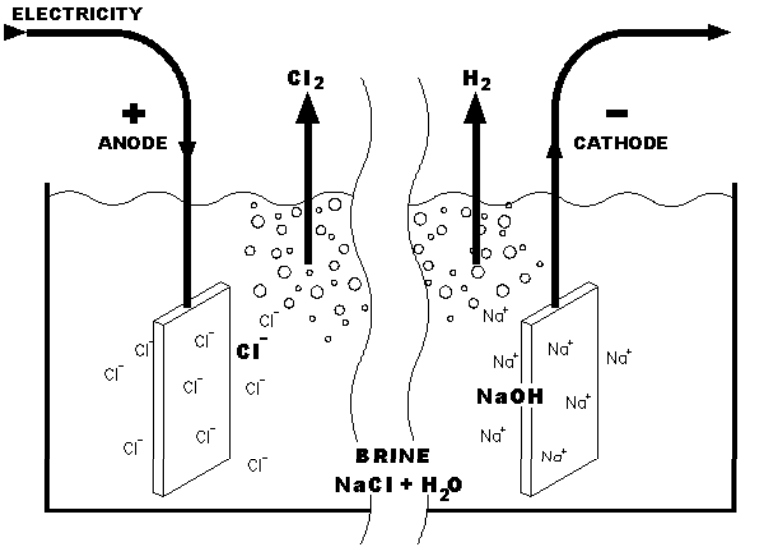
Cellroom Emission Improvements

From 1997 to 2003 the Pioneer St. Gabriel Plant has invested over $12,000,000 in 26 improvement projects!

Cellroom Emission Improvements

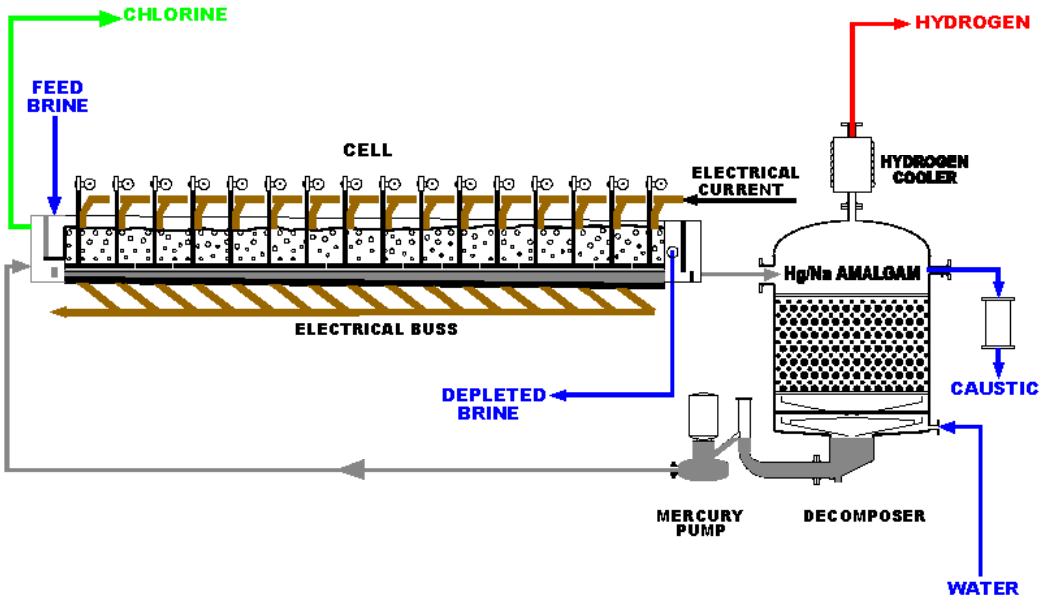
- ✓Cell Technology Upgrade
- ✓Decomposer Improvements
- ✓Concrete Beam Rehabilitations
- ✓Seal Less Mercury Pumps
- ✓Sealed Hydrogen Coolers
- ✓Side Panel Stud Replacements
- ✓Improved Cell Gaskets

Chlor Alkali Electrochemistry



$$2NaCl + 2H_2O \xrightarrow{e^-} Cl_{2(g)} + 2NaOH + H_{2\,(g)}$$

A Mercury Cell



Cell Technology Upgrade

“State of the art” cell tops with 16 frames to individually adjust each row of Runner™ anodes. Computer controlled anode adjusting system.

Reduces the number of cell openings from once each year to every three to five years.

40% increase in mercury inventory for each cell recommended by technology supplier.

Estimated installation costs are $8,500,000.

Benefits of Cell Technology Upgrade

Less cell maintenance and fewer cell opening results in reduced emissions.

Stabilizes the cathode by increasing the thickness of mercury on the cell bed.

Reduces the effects of cell bed roughness allowing for lower cell voltage.

Lower amalgam concentrations.

Reduced hydrogen in the chlorine gas.

Extends the days between brine washing of the cell.

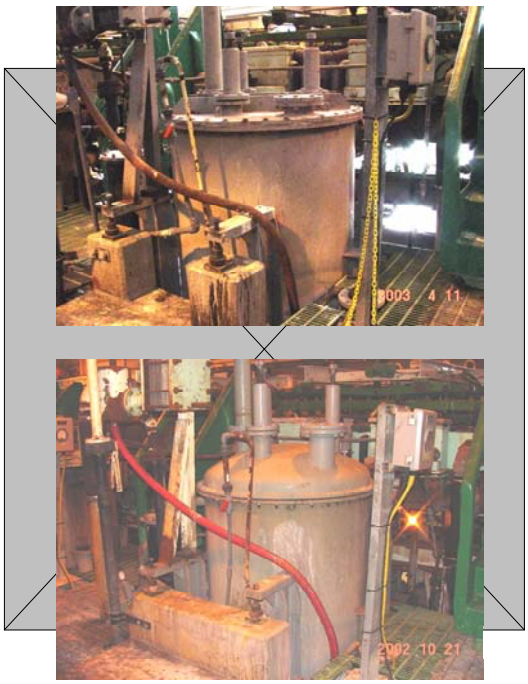
Decomposer Improvements

The decomposer is a critical cell component that was identified as a source of mercury emissions.

Nickel lining increases decomposer shell life.

GORE-TEX® gasket and stiffer head design improves seal integrity.

Larger decomposers with more graphite require fewer openings.



Concrete Beam Rehabilitations

Steel reinforced concrete beams that support cells deteriorated at the outlet end. All concrete beams were rehabilitated and coated with an epoxy seal to prevent mercury accumulation.

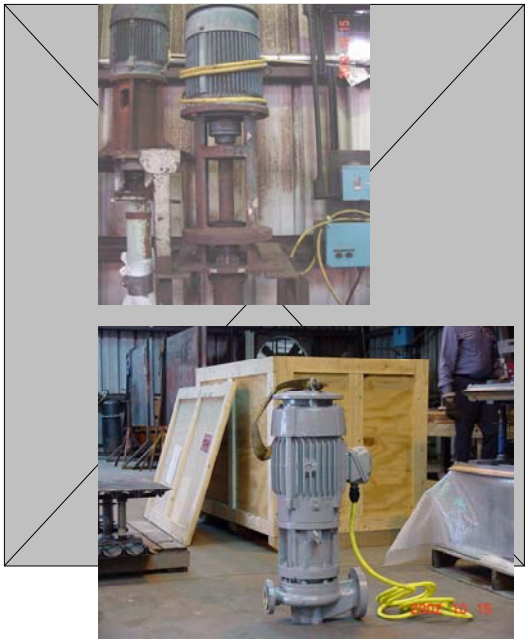
Reduces emissions from mercury trapped in concrete cracks and crevices.

Seal Less Mercury Pumps

Magnetic drive seal less pumps replace pumps with a dry packing gland shaft seal.

Mercury emissions from the pump packing are eliminated.

All 52 pumps will be replaced in 2003. 30 pumps are complete.



Sealed Hydrogen Coolers

Install Alfa Laval welded plate design.

Existing plate and frame heat exchanger gaskets have been a source of hydrogen and mercury emissions.

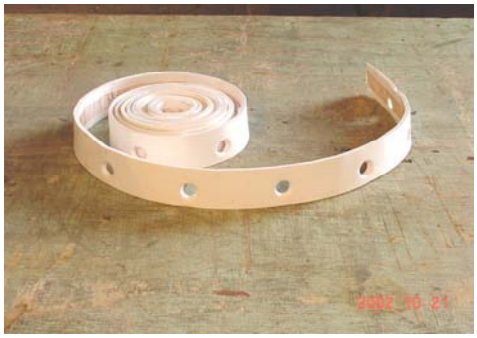
$900,000 for 42 cells. 11 cells are complete. 16 will be replaced in 2003. 15 will be replaced in 2004. 10 cells already had a sealed design cooler.

Improved Cell Gaskets

Replacement of EPDM gaskets for endboxes and decomposers with GORE-TEX® for improved sealing and leak reduction.

GORE-TEX® gaskets are used to seal all cell components. 34 cells have been retrofitted with these gaskets.

All cells should have GORE-TEX® gaskets by the end of 2004.



Side Panel Stud Improvements

A cell is 40 feet long with a 3/8” stud every 6” used to hold the side panel in place. During 30 years of operations some of the studs have corroded, broken or stripped, resulting in potential leak points.

A unique repair method was developed. All repairs were made in 2001.

SUMMARY

- ✓Great team at St. Gabriel
- ✓Pioneer management support
- ✓Industry wide participation
- ✓EPA involvement